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The Art of Science: Science of the Future in Light of Alterations of Consciousness

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Abstract—In presenting the data concerning altered states of consciousness in an even-handed manner, I have found that I cannot at the outset assume that materialism is the correct theory of reality. As demonstrated by survey data, the beliefs about consciousness and reality of academics and scientists who could write about consciousness in the academic literature range along a material-transcendent dimension from materialist through conservatively transcendent to extraordinarily transcendent positions, each with its corresponding notions of consciousness and proper methodology. Scientists need to undertake a process of self-examination in order to determine their personal beliefs and learn to set them aside in order to be free to examine the evidence. A materialist position cannot be presupposed at the outset, given that some altered states phenomena suggest that consciousness may be non-local. Given the subjective nature of experiences in altered states of consciousness, the acquisition of introspective skills on the part of the investigator may be a necessary methodological extension of science, along with a concomitant development of personal integrity, determination of physiological and behavioral correlates of subjective experiences, evaluation of judgments of certitude with regard to the reality of subjective events, and development of the ability to interpret the meanings of symbols. Experiences with psychedelic drugs and, more forcefully, transcendent events raise the possibility of the presence of a mode of understanding superior to sensory perception and ratiocination. In effect, extensions of science could involve various degrees of self-transformation of the scientist herself in such a manner that, in some cases, the science of the future may be more art than science.

Keywords: science — altered states of consciousness — beliefs about consciousness and reality — out-of-body experiences — scientific methods — introspection — consciousness — dreams — symbols — mystical experiences — transcendent states

Introduction

In teaching and writing about altered states of consciousness, I have encountered a problem. In order to present the data concerning altered states of consciousness in an even-handed manner, I cannot begin with the assumption that materialism is the correct theory of reality. The problem is that materialism is still the baseline worldview accepted by many scientists, so that a balanced presentation of information concerning altered states can be rejected out of

hand as unscientific by the scientific community. The purpose of this paper is to suggest ways in which the science of the future can be expanded as a result of the need to encompass phenomena occurring in altered states of consciousness.

Beliefs About Consciousness and Reality

For most of the scientific enterprise, the ontological beliefs held by scientists are irrelevant to the subject matter that they are investigating. That is not true, however, for the study of consciousness. Indeed, an investigator's ideas about consciousness are intimately linked to her beliefs about the nature of reality, as Robert Moore and I found in a 1986 survey of academics and professionals who could potentially write about consciousness in the academic literature (Barušs, 1990a; Barušs & Moore, 1989). On the basis of 334 completed questionnaires using various multivariate analyses, we found a clear material-transcendent dimension of beliefs about reality with correlated notions of consciousness.

We summarized the data by noting that there were three positions that could be identified along the material-transcendent dimension: the materialist, conservatively transcendent and extraordinarily transcendent. The materialist position is defined by a belief that reality is exhaustively physical in nature and that science is the proper way to know reality. The conservatively transcendent position is characterized by both the importance placed on meaning and religious ideation, the notion that reality has both physical and non-physical aspects and that hermeneutic knowledge may be more profound than scientific knowledge. The extraordinarily transcendent position consists of claims of extraordinary experiences such as mystical experiences, of extraordinary beliefs such as a belief in reincarnation and emphasis placed on examination of the inner experiential world and self-transformation. Those tending toward the extraordinary position believe that the physical world is an extension of a mental reality and that there are paranormal means of obtaining knowledge.

These beliefs about reality were intertwined with notions of consciousness, so much so, in fact, that in subsequent discussions, Robert Moore and I simply referred to them as "beliefs about consciousness and reality" (Barušs & Moore, 1992). Those tending toward a materialist position are likely to think of consciousness as information in an information-processing system, as an emergent property of brains or computation, and as being characterized by always being of or about something, a property of mind that is known as "intentionality" in the philosophy of mind. Those tending toward a conservatively transcendent position emphasize subjective aspects of consciousness and see consciousness as giving meaning to reality and as being evidence of a spiritual dimension. For those tending toward the extraordinarily transcendent position, consciousness is the ultimate reality as well as the key to inner growth, and emphasis is placed on altered states of consciousness rather than objective or subjective aspects of the normal waking state. The significance of con-

TABLE 1
Correlations of Beliefs About Reality With Various Variables

Variables	Beliefs about reality		
	Materialism	Conservative transcendence	Extraordinary transcendence
Characteristics	Physicalism	Religiosity, meaning	Extraordinary experiences, extraordinary beliefs, inner growth
Mind-body problem	Physical monism	Dualism	Mental monism
Epistemology	Science	Hermeneutics	Paranormal
Religious affiliation	None	Traditional	Own beliefs
Notions of consciousness	Information Emergent property Intentionality	Subjective Gives meaning Evidence of spirit	Altered states Ultimate reality Key to growth
Significance of consciousness	By-product	Important	All there is

Note: Adapted from Table 5.14 (Barušs, 1990a, p. 129).

sciousness increases from being a by-product of information processing for the materialist to being critically important for the conservatively transcendent to being all that exists for the person at the extraordinarily transcendent pole. A summary of the results is given in Table 1.

This brings up the first point about the future of science, namely, the necessity for scientists to examine their beliefs about consciousness and reality. In addition to mastering the body of literature in their respective disciplines and learning relevant research skills, scientists may need to undertake a process of self-examination to determine their personal beliefs and to learn how to set them aside in order to be free to examine the evidence.

This is not as easy as it at first appears. Considerable effort can be required to understand oneself. However, there are techniques that have been developed in different traditions (e.g., Ferrucci, 1982) that can be used by someone interested in examining and changing her psychological nature (Barušs, 1996). It would not be difficult to introduce practices from this body of knowledge to scientists as part of their training in order to facilitate their self-exploration. Indeed, the implications of the availability of these techniques go beyond the matter of freedom from being constrained by one's beliefs in that they could be used for more profound self-transformation, as will become apparent below.

Non-Local Nature of Consciousness

What are some of the data concerning alterations of consciousness that are cramped by materialist assumptions? The following edited account written by

one of my students is an example of a type of experience that recurs frequently in the literature.

There have been a few incidents in the past in which I have awoken in the middle of the night and been unable to move. It is as though my mind is wide awake, perhaps more so than usual, and yet my body is in a coma. This can be very scary and yet exhilarating at the same time. One time in particular stands out. One I will never forget.

I awoke in this state one night, only I wasn't in my bedroom. I was looking down at my sleeping boyfriend in his apartment. I could see everything clearly and knew without a doubt that I was not dreaming. I saw his dog in the corner and the piles of clothes next to the bed. I knew I was there and yet my body was asleep at my house.

I awoke moments later and called my boyfriend. I immediately began to describe his bedroom in detail—the red shirt I had bought him crumpled next to his pillow, the position of the dog, the half drunk glass of water on the night stand—details that I never would have known had I not been there. And they were all true. We were both terrified and yet had never felt closer. I had had an out-of-body experience, where my mind journeyed to its own destination and my body was left behind.

If I were to start with the assumption that consciousness is necessarily skull-bound, then I would interpret this account by saying that this was a dream, some of the details of which happened to match those of an actual situation because the dreamer was familiar with her boyfriend's behavior, that the degree to which the dream imagery matches actual events is probably overstated, and I would conclude by reminding everyone that anecdotal data don't count. In so doing I would dismiss out of hand the possibility that consciousness could act in a non-local manner.

Is consciousness, in fact, non-local? While the research concerning the veridical nature of perceptions during out-of-body experiences is inconclusive (Alvarado, 2000), there have been studies along other lines demonstrating non-local properties of consciousness, such as the research programs at the Princeton Engineering Anomalies Research Laboratory (Jahn & Dunne, 1987; Nelson et al., 1996) and Stanford Research International (Puthoff, 1996; Targ, 1996). Whatever one's evaluation of the results of these programs may be, the point is that we cannot begin a discussion of altered states of consciousness with the assumption that people's experiences cannot possibly be what they appear to be whenever they fail to conform to our opinions about the world.

I want to point out that outside the scientific community we have the same problem from the opposite side. There are those who assume that anomalous phenomena, genuine or assumed to be such, offer proof of their non-consensual beliefs about reality without any critical evaluation of those beliefs. Furthermore, because these people have accepted something that is unacceptable to mainstream science, they may tend to interpret all criticisms of their beliefs as standard criticisms being launched from the mainstream position. The existence of this group poses problems for the scientist because not only could she be misidentified as a wacko by debunkers, but she also could be rejected by various believers as a mainstream scientist.

Introspection

There is something else in my student's account of her out-of-body experience to which I want to draw attention. She said, "I ... knew without a doubt that I was not dreaming." Her knowledge that she was not dreaming is a judgment that she made about her subjective state of mind. Because of the pervasively subjective nature of consciousness, the primary data of consciousness studies are not directly available for third-person inspection.

To help to understand this, it is necessary to recognize that there are three domains of discourse in the study of consciousness: the physiological, the cognitive and the experiential. The first of these is involved with the investigation of brain processes, facilitated recently by advances in brain-imaging techniques (Lester et al., 1997), and hence is concerned with objective data. The cognitive domain of discourse, concerned with thinking, memory, language and so forth, officially depends on the observation of behavior, although much of that observation ends up being semantic interpretation of verbal behavior and to that extent depends on participants' descriptions of their experiences. The experiential domain of discourse is unabashedly subjectivist with third-person access only through others' first-person accounts.

There has been agreement for quite a while among consciousness researchers that there are explanatory gaps between these domains of discourse (e.g., Jackendoff, 1987). Recently, following David Chalmers' lead, the gap between the objective nature of nature and the subjective nature of experience has been dubbed the "hard problem of consciousness" (Chalmers, 1995, p. 201). Philosophers such as Daniel Dennett (1978), William Lycan (1987) and Owen Flanagan (1992) have claimed success in closing the gap from below, although as I and others have pointed out, their arguments are riddled with problems and rely heavily on the a priori belief in the ontological primacy of the objective aspect of reality (e.g., Barušs, 1990a, 1990b, 1998, respectively).

What is becoming clear is that first-person accounts cannot be ignored. Using an instrument derived from the one used in our original 1986 study (Barušs & Moore, 1992), Robert Moore and I surveyed participants at the 1996 international meeting "Toward a Science of Consciousness 'Tucson II.'" Of 212 participants who responded to our questionnaire, 93% agreed that "Introspection is a necessary element in the investigation of consciousness" (Barušs & Moore, 1998, p. 486). Current interest in first-person methodologies is also evidenced by calls for systematic phenomenological mapping of altered states of consciousness (Walsh, 1995) and a cartography of anomalous experiences (Berenbaum et al., 2000).

But introspection of one's own consciousness is not easy. Introspection had a history in the 20th century of being discredited for all kinds of reasons (Lyons, 1986). Recently there have been efforts to grapple with the problems posed by introspection as a research strategy (e.g., Farthing, 1992; Pekala & Cardeña, 2000; White, 1988). It should not come as a surprise to find that seri-

ous training of the mind appears to be necessary in order to introspectively know something of its nature (Needleman, 1965; Tart, 1989; Wallace, 1998).

In other words, the technologies of the scientist who wishes to understand the nature of consciousness may be internal and not external as they are for much of the rest of science. And the data, as such, may only be available to those who have developed the appropriate introspective skills, while the rest of us get to listen to their accounts, in the same way that the data of astronomical events is directly available to astronomers who know how to look through a telescope, while the rest of us get to listen to what they have to tell us. It is naive to assume that we will learn anything meaningful about consciousness without the development of skills at least of the order of magnitude of those required in astronomy (cf. Tart, 1972).

Accepting the results of a study from a researcher whose data are derived from an examination of her own mind may make some scientists uneasy. For instance, it would be difficult, if not impossible, for someone else to check up on her. Such checking up would necessitate becoming skilled in the same introspective strategies as those used by the investigator and, having used them, not being guaranteed that differences in observations were not the result of real differences between individual psychological events. With no one to scrutinize a researcher's inner investigations, the soundness of her results rests on her integrity as an investigator. Indeed, the certitude of knowledge obtained by someone for whom certain events have occurred is likely to be different from that of someone for whom the same events have not occurred. For example, many of those who have had near-death experiences are convinced, as a result of such experiences, that life does not end with death (Greyson, 2000). Those who hear about but have not had near-death experiences are typically not as convinced. Such relativization of knowledge to individual investigators serves to increase the extent to which the scientific community is stratified with regard to beliefs about the nature of consciousness and reality (Barušs, 1996).

It is possible that the body of scientific knowledge may end up being less divergent in reality than prospect, in that investigators' accounts of their subjective experiences may coincide. The consistency of accounts including agreement with regard to specific details has been used as an argument, for example, for the objective nature of alien abduction experiences (Appelle et al., 2000; Bryan, 1995).

It is important, however, to distinguish such constructive agreement from agreement that results from the pressure to conform to social expectations. Such conformity has been characterized as inauthenticity by Martin Heidegger (1962 [1926]) and has been extensively empirically studied by social psychologists (Cialdini, 1988). The inauthentic mode of science is characterized by devotion to the accumulation of facts, adherence to the use of rigid methods by which these facts are to be generated in a manner that is free from contamination, and persistent belief in a materialist worldview in the face of disconfirmatory evidence. On the other hand, the purpose of authentic science is

the acquisition of knowledge by someone, the flexible development of methods by which such knowledge can be sought, and the continued edification of worldviews, materialist or otherwise, in order to properly account for any resultant data. Authentic science is the practice of science free from social pressures that can otherwise constrain the course of one's research (Barušs, 1996).

It is important to point out that the introduction of introspection in science represents an extension and not a replacement for methodologies that are currently in use. Thus, for instance, to the extent that physiological and behavioral correspondences can be found for subjective events, they should be included in any discussion of phenomena associated with consciousness. The problem is to find such physiological and behavioral correspondences, if there are any, and to determine their relevance for any given phenomena associated with consciousness.

It may be instructive in this regard to consider the failed interplay of subjective accounts and physiological data for a time in the history of dream research. Before 1953, dreams were studied by soliciting reports of spontaneously recalled home dreams. In 1953, through the use of physiological measures, rapid eye movement sleep was identified as a distinctive stage of sleep, from which, when awakened, subjects would often report that they were dreaming. In the late 1950s, many dream researchers accepted the idea that dreams occurred only during rapid eye movement sleep and, on that basis, were enthusiastic about the possibility of developing physiological explanations of dreaming. In the 1960s evidence accumulated that dreams indistinguishable from those that occurred during rapid eye movement sleep could be found in any of the sleep stages. Substantial efforts made during the 1960s and 1970s failed to find strong physiological correlates of dreaming, so that by 1980, there was a loss of interest on the part of psychophysicists in dream research. However, with the 1980s came a resurgence of the study of home dreams even though it was clear at the time that such dreams are not representative of all dreams obtained by awakening people during different stages of sleep in a sleep laboratory (Foulkes, 1996). Clearly it is of benefit for a full understanding of dreams to study both subjective accounts and any physiological correlates of dream contents.

Another source of uneasiness on the part of some scientists is the degree of certitude concerning their knowledge that people sometimes express who have had experiences in altered states of consciousness. My student did not just say that she knew that she was not dreaming, she said that she knew "without a doubt" that she was not dreaming. Our tendency is to doubt that she knows without a doubt. What is going on here? It is possible that there is a process by which we discriminate what is real from what is not real that breaks down in some situations (Bentall, 2000). For example, when asked to recall further information to which they have been previously exposed, those who have been hypnotized to elicit the further information do not report more additional correct items than those who have not been hypnotized. However, hypnotized

subjects erroneously indicate greater confidence that their incorrect responses are correct than those who have not been hypnotized (Whitehouse et al., 1988). How trustworthy, then, are judgements about the degree to which an event is real? Just as with introspective examination of the mind, it may be that discriminating what is real from that which is imaginary may require greater skill than we ordinarily suppose. Indeed, our judgments concerning the reality of everyday reality may also be incorrect, as has been suggested by some who have examined the nature of their own minds (e.g., Walsh, 1984). Thus it is possible that experiences in altered states of consciousness may, in fact, be more real than everyday reality, even though their noetic value remains apparent only for the person to whom those experiences have occurred.

There is a further problem. The waxing and waning of dream research has been mentioned. But what did the dream researchers find? Do dreams mean anything? Well, that depends on who gets asked. For those who think that dreams do mean something, one way to proceed is to interpret dream imagery through a mixture of private and culturally shared meanings (Stevens, 1995). For example, I play ice hockey, and scoring goals while playing hockey in my dreams is associated with the publication of my academic writing. I am not certain of the consistency of that association, but it seems to me to be a reasonable one to make on the basis of having analyzed my dreams for the past 25 years. I doubt, however, that there are many others for whom playing hockey in their dreams has the same meaning that it has for me. Inner experiences can be symbolic rather than literal, and the meanings of the symbols may differ among experiencers. As an illustration of the dilemma that this poses, consider the synesthete who sees color when she hears music and, as a composer, writes music that looks good to her but may not sound so good to others who, of course, are unable to see what she sees when she hears the music. Furthermore, images in dreams can have layers of interpretations, all of which can be meaningful in different ways for a person. And, of course, just as dreams can potentially provide information about one's academic publications, they can also contribute to one's knowledge of oneself. But in that that knowledge is mediated by a creative process of interpretation, in some cases, the science of consciousness may necessarily be more of an art than a science.

Introception

But perhaps we can extend science even further. On April 20, 1962, 10 divinity students were each given 30 milligrams of psilocybin before a Good Friday service in what has become the most famous experiment in the psychology of religion. What the investigator Walter Pahnke found at the time and at a six-month follow-up, and what was confirmed by Rick Doblin in a 24- to 27-year follow-up, was that the experiences of the divinity students had had genuinely mystical features and had been evaluated by them as having been important to their spiritual lives (Doblin 1991; Pahnke, 1963). For example, one of the participants, Mike Young, said that he had found that "religious ideas that were

interesting intellectually before ... [were now] connected to something much deeper than belief and theory” (quoted in Malmgren, 1994). According to Young, direct personal experience allowed him to validate his religious ideas. And yet, psychedelic experiences may not have nearly the impact on one’s understanding of reality that some drug-free transcendent experiences have had (Smith & Tart, 1998).

From a traditional point of view in science, we assume that there are only two ways of knowing: data gathered from sensory impressions and rational thought. The contention is that in some altered states of consciousness, those variously called mystical or transcendent, another way of knowing becomes possible, one that perhaps supercedes both sensory perception and ratiocination as an effective means of knowledge, particularly with regard to existential questions. That is to say, altered states of consciousness may have noetic value. Maybe those for whom transcendent events have occurred really are enlightened (Barušs, 1996; Wulff, 2000).

Let us consider the case of Franklin Wolff. In 1936, after 24 years of effort, a state of consciousness occurred for Wolff in which the ordinary ways of experiencing the world were replaced with events that were outside time, space and the subject-object dichotomy that ordinarily constrains consciousness. There were numerous positive changes, including changes in consciousness, self-identity, cognition and affect. In particular, a new way of knowing became operative in this state—a way of knowing that he called “introception”—that consisted of knowing through identification with that which is known.

For Wolff, there is an inverse relationship between the transcendent domain and the perceptible world. Some concepts, such as physical objects like tables and chairs, are perceptually thick but introceptually thin, while others, such as mathematical constructions like categories and topoi, are perceptually thin but introceptually thick. According to Wolff, his contribution to Western philosophy was the recognition that the Western penchant for abstract thought could be used as a means of preparing oneself for enlightenment. In particular, for Franklin Wolff, mathematical yoga consists of the practice of pure mathematics in such a way as to be cognizant of the meanings inherent in mathematical constructions without presuppositions about the outcome of any investigation. In other words, mathematics, at the heart of science, through one’s engagement with concepts that are introceptually thick, may be an optimal approach to transcendent states of consciousness in which modes of understanding superior to sensory perception and ratiocination become possible (Barušs, 1996; Merrell-Wolff, 1994, 1995a, 1995b).

Implications of Altered States Research for the Future of Science

Consideration of altered states of consciousness presents challenges to contemporary science and results in implications for the manner in which science could be extended. In effect, we end up with various degrees of self-transformation of the scientist herself, ranging from the examination of her own be-

liefs, through introspection and the determination of any symbolic meanings of subjective experiences, to mystical aspiration. But in what sense is this still science? It turns out that what it is that science is is not what we often think that science is (e.g., Barušs, 1996; Bauer, 1992), so that the perceived need for the development of a subjective science (e.g., Jahn & Dunne, 1997) can be met without violating the rules of scientific method (e.g., Tart, 1972) or by at least retaining the original purpose of science in the extensions outlined above (Barušs, 1996). But how much of an art can science become before it ceases to be science? I'm not sure that that question matters. An authentic scientist wants to know the nature of consciousness and reality. And if self-transformation appears to be a necessary route to the acquisition of knowledge, then the terminology applied to that methodology is unlikely to matter.

In summary, then, the following are the implications of altered states research for the future of science:

1. Scientists may need to undertake a process of self-examination to determine their personal beliefs and to learn how to set them aside in order to be free to examine the evidence.
2. A scientist who wishes to understand consciousness may need to develop appropriate introspective technologies that may take the same training and dedication as skills required in other areas of science.
3. The science of consciousness may require the creative interpretation of symbols that themselves may be unique for different individuals.
4. There may be modes of understanding superior to sensory perception and ratiocination that a scientist can develop in order to acquire knowledge about the nature of consciousness and reality.
5. Taken together, these implications of consciousness research for science suggest that for science to be science, in some cases, the science of the future may be more art than science.

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